Abstract Of The Disclosure

Methods and apparatus are disclosed for measuring controlling characteristics of clusters in a cluster ion beam, including average cluster ion velocity $\bar{v}$, average cluster ion mass $\bar{m}$, average cluster ion energy $\bar{E}$, average cluster ion charge state $\bar{q}$, average cluster ion mass per charge $\left(\dfrac{m}{q}\right)_{average}$, and average energy/charge $\left(\dfrac{E}{q}\right)_{average}$. The measurements are employed in gas cluster ion beam processing systems to monitor and control gas cluster ion beam characteristics that are critical for optimal processing of workpieces by gas cluster ion beam irradiation.

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